



MINISTRY OF METEOROLOGY,  
ENERGY, INFORMATION, DISASTER  
MANAGEMENT, ENVIRONMENT,  
CLIMATE CHANGE AND  
COMMUNICATIONS (MEIDECC)  
NUKU'ALOFA, TONGA

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## **2020–2021 Tropical Cyclone Season Updated Outlook for Tonga**

**High chance (80%) for at least 1 Tropical Cyclone to occur for the remainder of the TC Season (February – April 2021)**

**Moderate chance (60%) for at least 2 Tropical Cyclone to occur for the remainder of the TC Season (February – April 2021)**

**Low chance (20%) for at least 3 Tropical Cyclone to occur for the remainder of the TC Season (February – April 2021)**

(08<sup>th</sup> January 2021)

### **Recent Tropical Cyclone Activities**

Since the official start of the 2020-2021 Tropical Cyclone (TC) season on the 1<sup>st</sup> November 2020, two TCs has occurred and has been recorded over our Southwest Pacific region including Tonga. TC “ZAZU” (category 1) and Severe TC “YASA” (category 5). Both these TC systems occurred in our Tonga area of responsibility during the 13<sup>th</sup> – 20<sup>th</sup> December 2020.

TC “ZAZU” mainly affected the land areas and waters of the Vava’u group of islands with damaging gale to destructive force winds with heavy precipitation and flash floods. Severe TC “YASA”, however remained to the far western open waters of the Tongatapu and ‘Eua but had impacts of damaging gale force winds on Tongatapu and ‘Eua and with very rough to high seas accompanied by heavy damaging Northwesterly swells.

During every cyclone season there are active periods in which potential for tropical cyclone formation is increased. These active periods come around every 30 to 60days on average and lasts for a duration of about 2 to 3 weeks. There are at least three active periods in a typical TC season for the Southwest Pacific region.

The last active period for our current cyclone season occurred between the beginning to mid-December 2020. This resulted and contributed to the occurrence of TC “ZAZU” and TC “YASA” last month. This first active period for our current TC season was predicted and was released in our first TC outlook bulletin in October 2020.

### **Summary of the Updated TC Outlook for Tonga**

The next active period for the Southwest Pacific region (including Tonga) which indicates higher chances of TC formation is predicted to start in the last week of January and last until mid-February.

The Tropical Cyclone (TC) activity expected for the remainder of the 2020/21 TC Season to affect Tonga is likely to be around average (1 to 2 cyclones). Historical records indicate that Tonga could expect 80% chance of at least 1 cyclone to occur for the remainder of the TC season, 60% chance

of at least 2 cyclones to occur for the remainder of the TC season and 20% chance of at least 3 cyclones to occur for the remainder of the TC season. These cyclones will most probably occur between February to April with a moderate to high chance (50% to 70%) of at least 1 Severe TC occurring.

Any tropical cyclones passing close to the country, associated active cloud and rain bands may occasionally affect Tonga with marked rainfall and possible flooding, including sea flooding of low-lying coastal areas. Tropical cyclones to affect Tonga for the remainder of the 2020/2021 season should expect to be mostly coming from the Northwest (Fiji Area – 60%) and the rest from the West, North, East and Northeast.

About 4 to 6 named Tropical Cyclones are expected for the South West Pacific in the 2020/2021 season with 1 to 3 reaching severe intensity (Category 3 to 5). Tropical Cyclone formation areas is still expected to develop in the warmer ocean temperatures in the Australia and Papua New Guinea regions.

The remainder of the 2020/21 Cyclone Season is still expected to bring above average rainfall for all of Tonga during the remainder of this cyclone season due to La Nina conditions of our pacific region that is currently in place. In some cases, the average monthly rainfall can double especially for Ha’apai, Tongatapu and ‘Eua.

The peak time for the occurrence of tropical cyclones in Tonga is from January to March with most events occurring in February. Sea surface analysis indicates that the El Niño–Southern Oscillation (ENSO) continues to be in a La Niña phase. This La Niña like conditions of our ocean-atmosphere interactions is expected to be short lived and will likely prolong for until March 2020.

During La Niña events, Tonga normally receives above average rainfall activities. Climate models are also indicating that above normal rainfall over majority of Tonga during this Tropical Cyclone Season is highly likely. With current conditions at La Niña and in the view of the rainfall outlook for Tonga, there is an increased risk of heavy rain events and possible flash flooding in low lying areas in Tonga for the remainder of this TC Season. Cyclones that have affected Tonga in the past where current and forecast conditions are similar to the 2020/21 Cyclone Season are indicated in Table 1. An average of 1 Severe Cyclone occurs in moderate La Nina years.

<b>Cyclone Season</b>	<b>No. of Tropical Cyclone occurring in February – April timeframe of the cyclone season</b>	<b>No. of Severe Tropical Cyclone occurring in February – April timeframe of the cyclone season</b>
1970-1971	0	0
1973-1974	1	0
1974-1975	2	1
1988-1989	3	0
1998-1999	0	0
1999-2000	3	1
2000-2001	1	1
2007-2008	1	0
2010-2011	2	2
2011-2012	2	1
2017-2018	2	2
<b>Average</b>	<b>1.5</b>	<b>0.7</b>

*Table 1: Current sea surface temperatures patterns indicates that the 2020/21 Tropical Cyclone season is expected to be similar to 10 other seasons in the past (1970/71, 1974/75, 1988/89, 1995/96, 1999/2000, 2000/01, 2007/08, 2010/11, 2011/12, 2017/18)*

## **Statistical analysis of Tropical Cyclones occurrences in Tonga per ENSO Cycle since 1970**

Year	No of Cyclone seasons	No of Cyclones	No of Severe Cyclones	Average	Average No of Severe Cyclones
Neutral Year	19	39	15	2.05	0.79
La Nina Year	11	20	9	1.82	0.82
El Nino Year	14	42	19	3.00	1.36

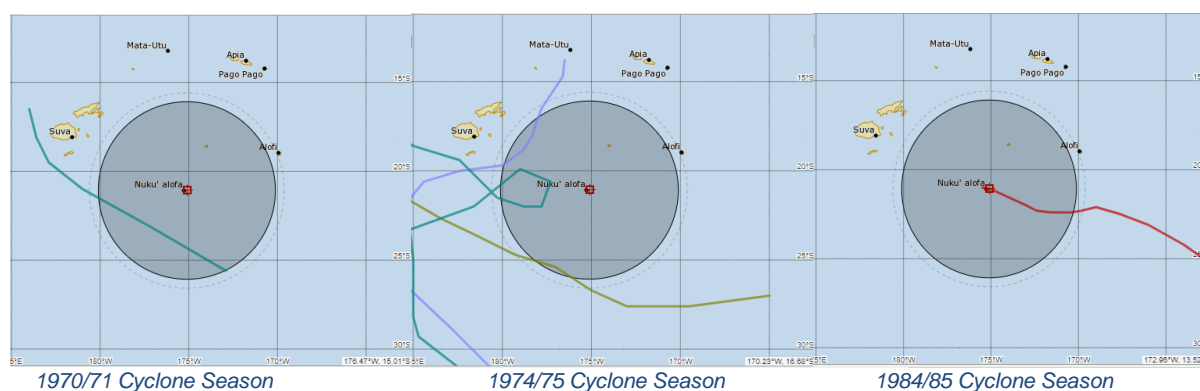
Table 2: Historical statistics of cyclone occurrence since 1970 indicate that during La Nina years there is lower risk of tropical cyclone occurrence

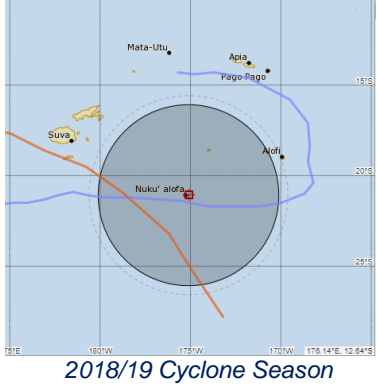
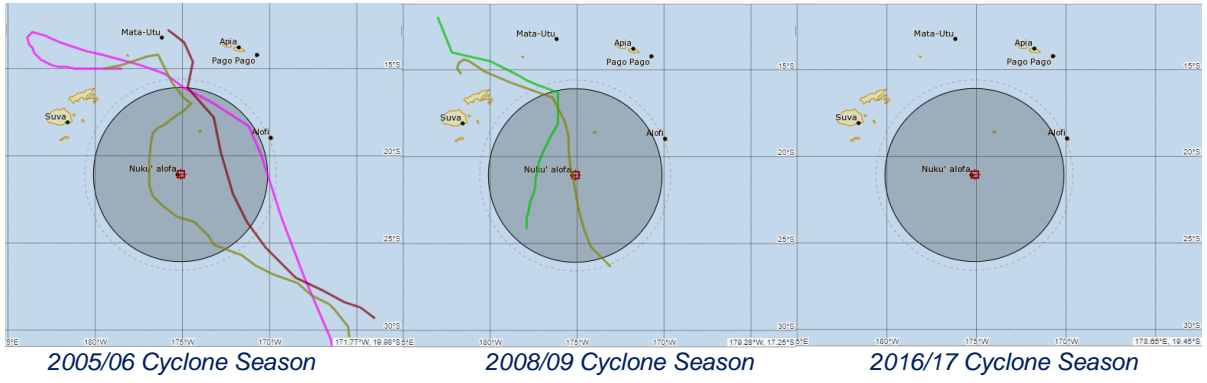
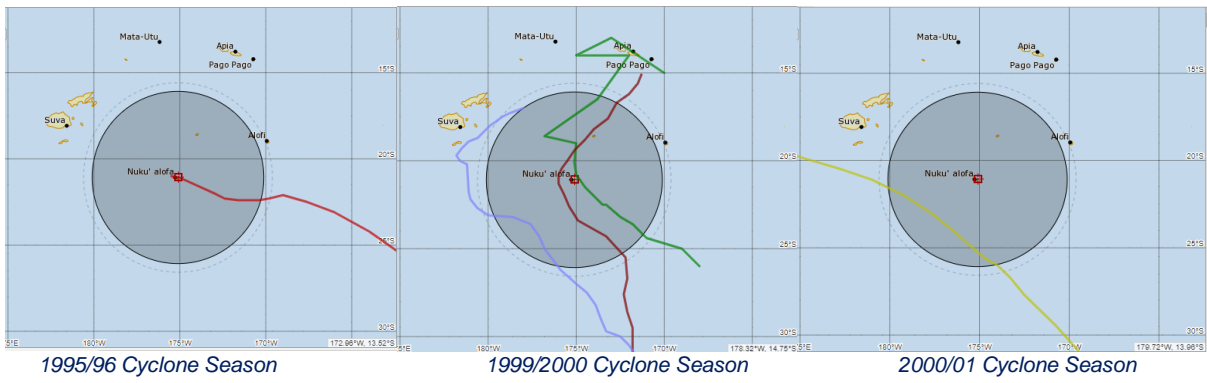
### Severe Tropical Cyclones that have occurred in years similar of this coming cyclone season

Island Group	Severe Cyclone	Season
Niufo'ou	VAL (Cat 4)	1974/75
Ha'apai	NIGEL (Cat 3), ERIC (Cat 4)	1984/85
Tongatapu/Eua	MONA (Cat 3)	1999/00
Tongatapu/Eua	PAULA (Cat 4)	2000/01
Tongatapu/Eua	VAIANU (Cat 3)	2005/06
Tongatapu/Eua	GITA (Cat 4), KENI (Cat 3)	2017/18

Table 3: Statistically severe tropical cyclone events that have occurred during La Nina years like this season there is a higher risk for a severe tropical cyclone to affect Ha'apai, Tongatapu and 'Eua during the 2020/21 Cyclone Season

### Cyclone tracks during LA Nina Cyclone Seasons with Sea Temperatures similar to this year





Expect Cyclone tracks to dominantly approach Tonga from the Northwest and West direction. There is higher risk of tropical cyclones to affect Ha'apai, Tongatapu and 'Eua if Tonga experiences any cyclones this season.

### Rainfall Analysis for the 2020/21 Cyclone Season (La Nina)

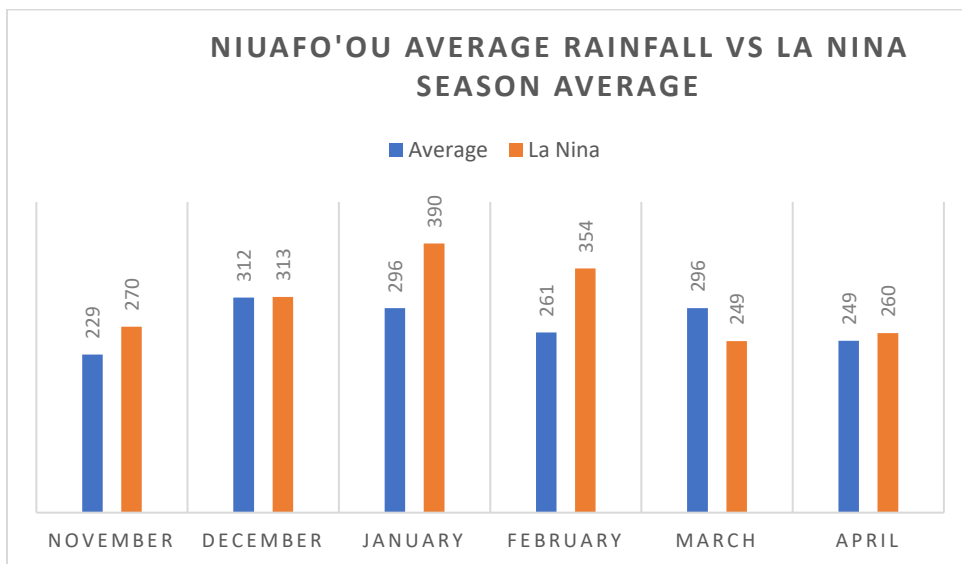


Figure 1: Expect peak above average rainfall in January and February for Niuafu'ou

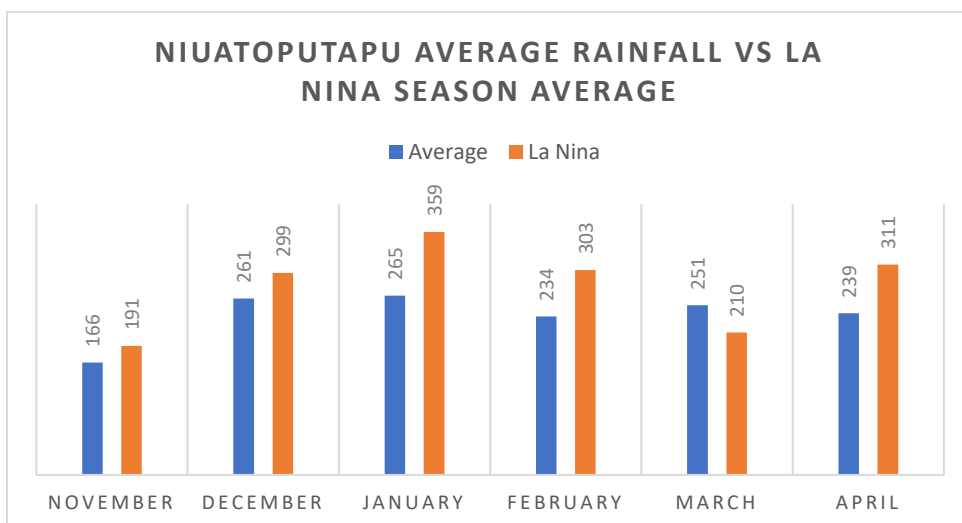


Figure 2: Expect peak above average rainfall in December, January and February for Niuatoputapu

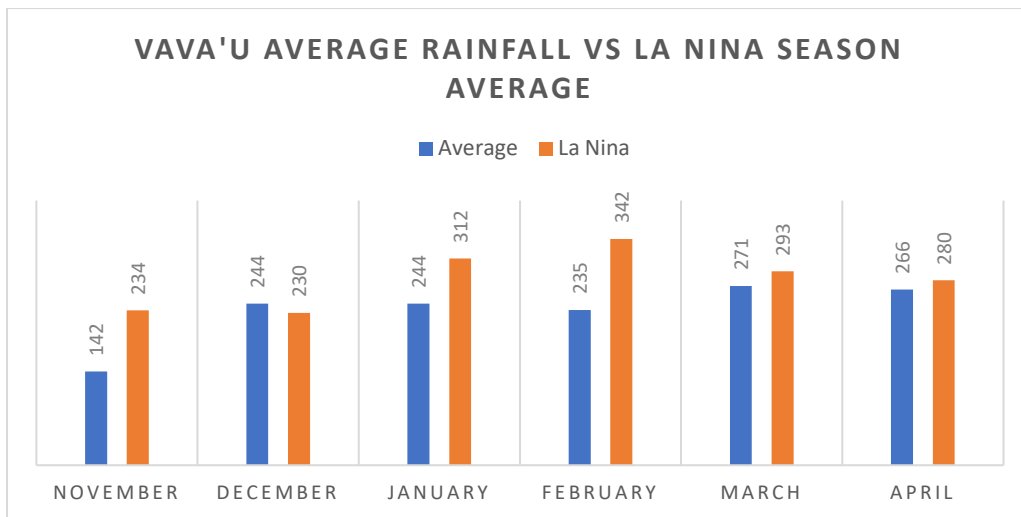


Figure 3: Expect peak above average rainfall in January, February, March and April for Vava'u

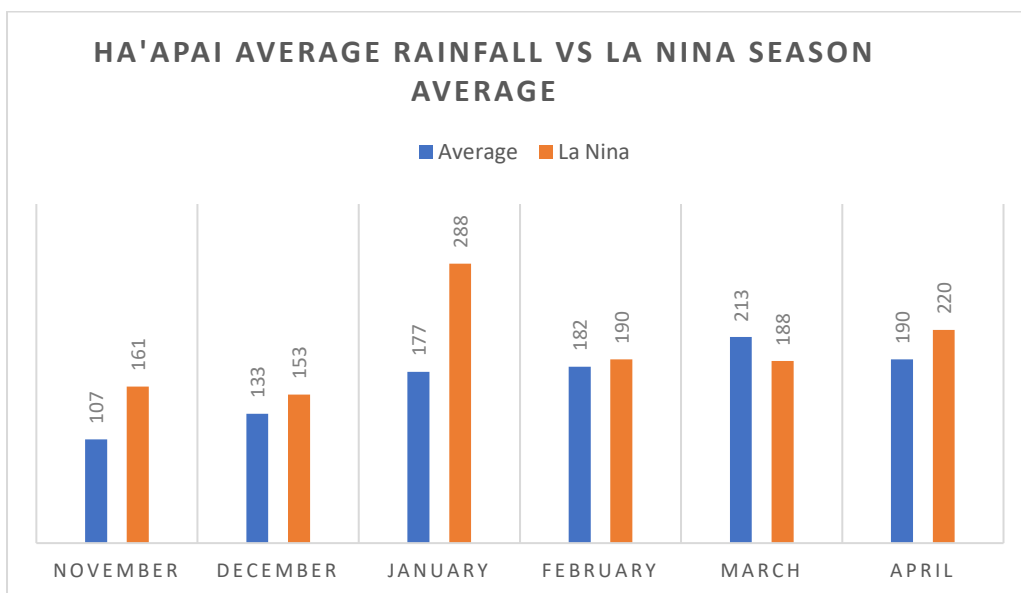


Figure 4: Expect peak above average rainfall in November, December, January and February for Ha'apai

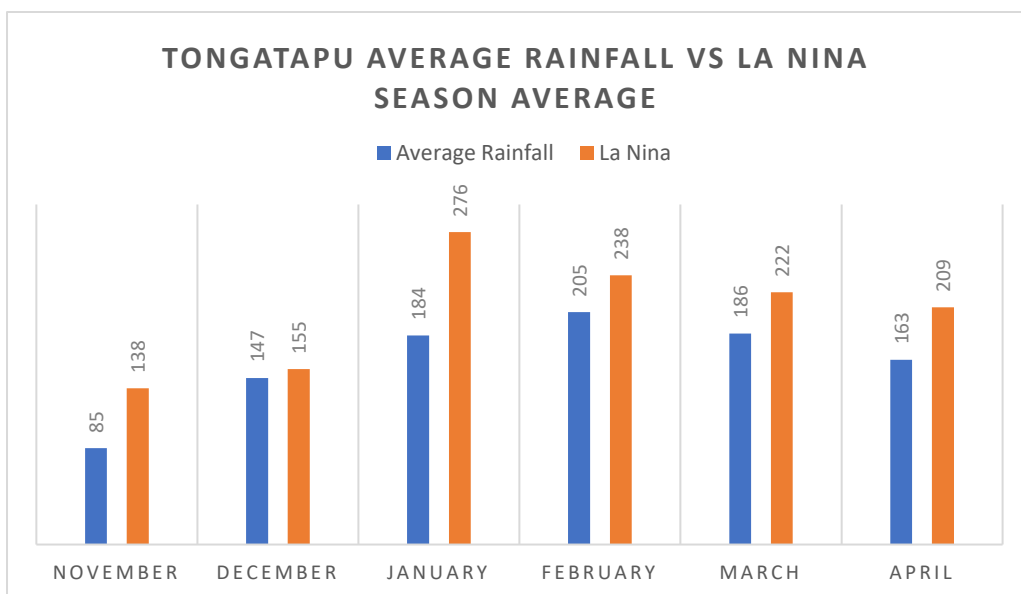


Figure 5: Expect peak above average rainfall in November 2020 to April 2021 for Tongatapu

## Likely Sector Impacts during the 2020-2021 Cyclone Season

### 1. Agriculture

Although there is less likelihood of Cyclone occurrence, it is the cyclone season so strong wind events will happen from time to time and crops prone to wind damage like Banana, Papaya and Breadfruit will be affected. At the same time, La Nina conditions will bring above average rainfall which will good for planting higher rainfall (big leaf plants) crops such as Kava, Taro, Banana and Kape. Weed management will be a must this season in order to get a good harvest.

### 2. Water

Water surplus during this season is to be expected. Therefore, rain water should be collected and harvested this season as much as possible to be used when the rains stop around April 2021. Clean roofs and replace guttering's.

### 3. Health

Higher risk of water contamination related diseases occurring due to above average rainfall. Mosquitoes will be abundant due to higher rainfall so mosquito management will be key to prevent mosquito transmitted disease like dengue.

### 4. Infrastructure

There is an 60% chance of one severe cyclone happening this season so the public are advised to fix shutters and trim trees near the house just in case we get a severe event.

### 5. Tourism

Moderate risk for Tourism activities due to 60% chance of a severe cyclone occurring.

### 6. Fisheries

Ocean nutrients will be abundant due to La Nina conditions so expect tuna fisheries to be good as well as trolleying. Expect low to moderate coral bleaching or algae blooms.

### 7. Utilities

Moderate risk of Communications, Water and Power utilities failures due to tropical cyclone activity. But high risk of flooding related problems.

### 8. Transport

Moderate risk of above than normal cancellations to ferry and aircraft operations due to stronger winds and tropical cyclone activity. Higher risk of flooding related problems to higher expectation of above average rainfall.

## Note of caution

It should be noted that the information provided is only to be used as guidance and the given range of tropical cyclone numbers is indicative only. It is expected that the total number of tropical cyclones could be in the vicinity of the listed values, and not necessarily within the given range. The values are the most likely number of tropical cyclones based on statistical and scientific evidence, including the influences by regional and global weather and climate variability drivers and indices.

All communities should remain alert and prepared throughout the 2020-2021 Tropical Cyclone Season and take heed of tropical cyclone alerts, warnings and advisories seriously whenever it is issued to reduce the effects on life and property.

All communities are urged to be vigilant and follow forecast information provided by the Meteorology Department of the Ministry of MEIDECC throughout the season. An update to this outlook will be issued around early March 2021.

**-END-**